Engineering and Technical Teaching Equipment

Unit: AE-PLC-CP. Industrial Control Processes Workstation

PLC programming software

Computer
(not included in the supply)

Key features:

➢ **PLC and HMI device programming software**

➢ **Projector and/or electronic whiteboard compatibility allows the unit to be explained and demonstrated to an entire class at one time.**

➢ **Suitable for applied research, real industrial simulation, training courses, etc.**

➢ **Totally safe, using three safety systems (mechanical, electrical and electronic).**

➢ **Designed and manufactured under several quality standards.**

➢ **Optional ICAI software to create, edit and carry out practical exercises, tests, exams, calculations, etc., apart from supervising the knowledge and progress achieved by the user.**

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⤷PRODUCTS
⤷60.- MECHATRONICS & COMPUMECHATRONICS

For more information about Key Features, click here

ISO 9001: Quality Management (for Design, Manufacturing, Commercialization and After-sales service)

European Union Certificate (total safety)

Certificates ISO 14001 and ECO-Management and Audit Scheme (environmental management)

Certificate and Worlddidac Member

INTRODUCTION

Since the 1950s, the computer integration in the manufacturing systems has been a complete revolution, increasing productivity and quality of all type of products. These computer integration systems include a lot of components from very different technologies as hydraulic, pneumatic, electrical, robotics, chemical, etc. For this reason, these type of systems requires workers with specific skills to ensure that they are working properly.

The Industrial Control Processes Workstation, "AE-PLC-CP", has been designed by EDIBON to study how an automatic industrial system carry out the control of diverse regulated processes by independent industrial controllers.

The "AE-PLC-CP" workstation includes a set of practical exercises through which the student will understand how an automatic industrial system performs the processes control.

GENERAL DESCRIPTION

The "AE-PLC-CP" is a process control workstation commanded by a PLC that coordinates the work of 3 industrial controllers that regulates in parallel the level, flow rate, temperature and pressure processes.

The "AE-PLC-CP" workstation has been designed as a modular system to facilitate the understanding of the equipment operation:

- The PLC: is composed by the CPU PLC unit and all the extra modules needed to perform a correct working of the workstation.
- The control panel: emergency stop push button switch, start/stop button, reset button, light indicator to show the state of the workstation, etc.
- The pneumatic circuit: contains the required such as solenoid valves, air filters, air regulators, etc. to assure the appropriate operation of the workstation.
- The workstation: is composed by real components used by the industrial processes controllers systems such as: industrial controllers, pumping system, pressure sensors, temperature sensors, etc.

The "AE-PLC-CP" workstation that can work alone and/or in conjunction with other workstations to make up a complete Flexible Manufacturing system*.

*The Flexible manufacturing systems product list is available at the "Flexible Manufacturing Systems (FMS)" area of the general catalogue.

SPECIFICATIONS

Tanks:
  4 transparent tanks.
  1.5 l of capacity each one approx.
Control panel:
  Mushroom head emergency stop push button switch.
  Start and Stop pushbuttons.
  Switch for manual or automatic operation.
  Light indicator.
  Led stack light.
  Terminal block to connect the individually identified inputs and outputs of the unit.
Electrical components:
  3 PID industrial controllers:
    Sample speed: 250 S/s.
    USB connector to PC for configuration and data logging.
    Software for the configuration and data logging.
  2 Peltier cells to temperature control.
  Hydraulic pump with maximum flow rate of 8 l/min.
  Helix agitator with range from 0 to 300 rpm.
  8 solenoid valves.
  Proportional electrovalve:
    Nominal voltage: 24Vdc.
    Pressure control range: 0 to 6 bar.
    Linearity: 1% full scale.
Pneumatic circuit:
  Air treatment unit:
    Filter-regulator and water trap.
    Manometer with double scale indicator.
    Shut-off valve.
  Pneumatic monostable 3/2 solenoid valves.
Sensors:
  Thermocouple type J.
  Capacitive level sensor from 0 to 300 mm.
  Pressure sensor with range from 0 to 1 bar.
  Turbine type flow rate sensor with range from 0.25 to 6.5 l/min.
  6 Capacitive sensors to control the maximum and minimum level of each tank.
Fault generation module:
  Box with lock with key.
  Allows generating 20 different faults.
  Each fault is generated through toggle switches.

Recommended accessories: (Not included)

• AE-PLCB. **Basic PLC Trainer (optional).**

The AE-PLCB is available with different PLC manufacturer models. All models contain the following modules:

N-ALI02: is the Main power supply.

N-CPU: is the PLC CPU that contain the digital In/Out terminals. All CPUs types allow to connect with the PC (for programming and monitoring) and the other modules of the trainer through an Ethernet network.

N-ESA: is the analog In/Out module used to acquire and generate analog signals.

N-HMIB: is the Human Machine Interface module with a touch screen.

N-MT: is the test module with switches, push buttons and potentiometers to generate digital and analog signals.

Software to program the PLC and the HMI device.

• AE-CP. **Air compressor module (optional).**

Low noise level: 40 Db maximum.

Capacity of the boiler: 9 l.

Power: 340 W.

Air intake: 50 l/min.

Maximum pressure: 8 bar or 0.8 MPa.

It Includes hoses to easy connect with the EDIBON units.

Cables and Accessories, for normal operation.

Manuals: This unit is supplied with the following manuals: Required Services, Assembly and Installation, Starting-up, Safety, Maintenance & Practices Manuals.

EXERCISES AND PRACTICAL POSSIBILITIES

1.- Introduction to flexible manufacturing system (FMS).

2.- Introduction to pneumatics and electro-pneumatics.

3.- Study of the sensor detection.

4.- Manual control of tank level.

5.- Automatic control of tank level with industrial controllers.

6.- Manual control of temperature.

7.- Automatic control of temperature with industrial controllers.

8.- Manual control of tank pressure.

9.- Automatic control of tank pressure with industrial controllers.

10.-Manual control of flow rate.

11.-Automatic control of flow rate with industrial controllers.

12.-Study of a complete automatic process control workstation.

13.-Study the faults inserted in the process with the fault generation module.

REQUIRED SERVICES

- Electrical supply: single-phase, 220V/50 Hz or 110V/60 Hz.
- Computer.
- PLC unit with at least 16 DI and 16 DO.
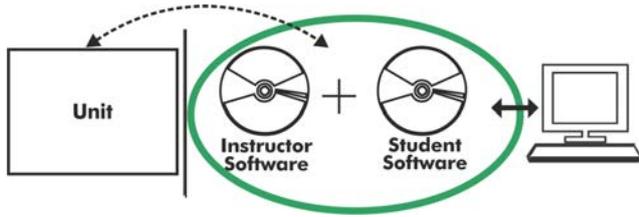- Compressed air with a 50 l/min of air flow and 8 Bar of pressure.

DIMENSIONS AND WEIGHTS

AE-PLC-CP:

  -Dimensions: 600 x 800 x 1200 mm approx.

                        (23.62 x 31.49 x 47.24 inches approx.)

 - Weight: 55 Kg approx.

                (121 pounds approx.)

RECOMMENDED ACCESSORIES (Not included)

- AE-PLCB. Basic PLC Trainer (optional).
- AE-CP. Air compressor module (optional).

AE-PLC-CP/ICAI. Interactive Computer Aided Instruction Software System:

With no physical connection between unit and computer (PC), **this complete software package consists of an Instructor Software (EDIBON Classroom Manager -ECM-SOF) totally integrated with the Student Software (EDIBON Student Labsoft -ESL-SOF).** Both are interconnected so that the teacher knows at any moment what is the theoretical and practical knowledge of the students.

Instructor Software

- ECM-SOF. EDIBON Classroom Manager (Instructor Software).

ECM-SOF is the application that allows the Instructor to register students, manage and assign tasks for workgroups, create own content to carry out Practical Exercises, choose one of the evaluation methods to check the Student knowledge and monitor the progression related to the planned tasks for individual students, workgroups, units, etc... so the teacher can know in real time the level of understanding of any student in the classroom.
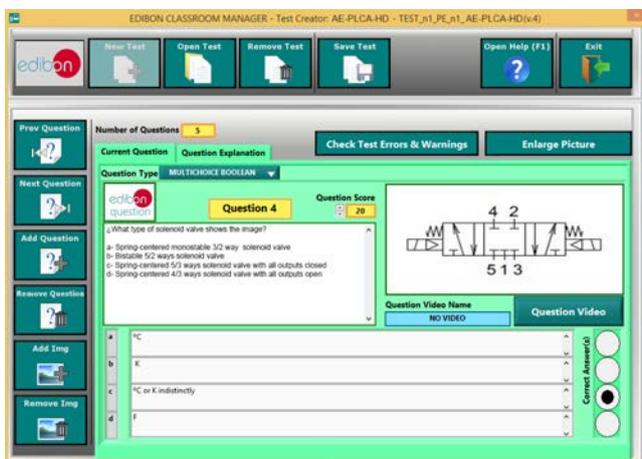
Innovative features:

- User Data Base Management.
- Administration and assignment of Workgroup, Task and Training sessions.
- Creation and Integration of Practical Exercises and Multimedia Resources.
- Custom Design of Evaluation Methods.
- Creation and assignment of Formulas & Equations.
- Equation System Solver Engine.
- Updatable Contents.
- Report generation, User Progression Monitoring and Statistics.

ECM-SOF. EDIBON Classroom Manager (Instructor Software)
Application Main Screen

ECAL. EDIBON Calculations Program Package - Formula Editor
Screen

ETTE. EDIBON Training Test & Exam Program Package - Main Screen with
Numeric Result Question

ERS. EDIBON Results & Statistics Program Package - Student
Scores Histogram

- ESL-SOF. EDIBON Student Labsoft (Student Software).

ESL-SOF is the application addressed to the Students that helps them to understand theoretical concepts by means of practical exercises and to prove their knowledge and progression by performing tests and calculations in addition to Multimedia Resources. Default planned tasks and an Open workgroup are provided by EDIBON to allow the students start working from the first session. Reports and statistics are available to know their progression at any time, as well as explanations for every exercise to reinforce the theoretically acquired technical knowledge.

Innovative features:

• Student Log-In & Self-Registration.

• Existing Tasks checking & Monitoring.

• Default contents & scheduled tasks available to be used from the first session.

• Practical Exercises accomplishment by following the Manual provided by EDIBON.

• Evaluation Methods to prove your knowledge and progression.

• Test self-correction.

• Calculations computing and plotting.

• Equation System Solver Engine.

• User Monitoring Learning & Printable Reports.

• Multimedia-Supported auxiliary resources.

For more information see **ICAI** catalogue. Click on the following link:
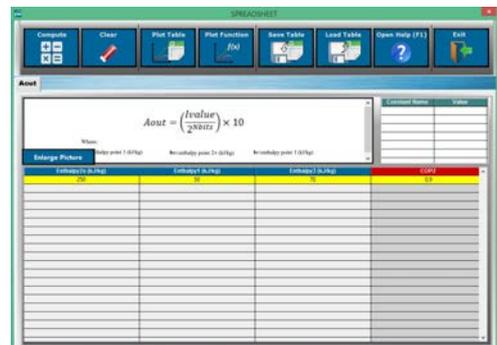www.edibon.com/en/files/expansion/ICAI/catalog

ESL-SOF. EDIBON Student LabSoft (Student Software)
Application Main Screen

EPE. EDIBON Practical Exercise Program Package Main Screen

ERS. EDIBON Results & Statistics Program Package - Question Explanation

ECAL. EDIBON Calculations Program Package Main Screen

✴ Specifications subject to change without previous notice, due to the convenience of improvement of the product.

INTERNATIONAL

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